

**WALL WATER PANEL****Technical Field**

5           The present invention relates to a water field box to be hidden in wall and, more particularly, to a water field box to be hidden in wall including a case having a flexible hose for connecting a soft duct and a water field inside, and a plate for opening/closing the case; wherein the flexible hose is coupled to the soft duct protected  
10   also coupled to the water field at the other end, the opening/closing plate has a frictional protrusion and a hole for repairing the plate, and a flange member around outline of the hole to be opened/closed by an opening plate, the socket having different diameters is for inserting and fitting a connection pipe of the water field and coupled to the opening plate through a port for inserting the socket and a threshold, both being formed on a part of the  
15   opening plate, and, at the same time, coupled and integrated with the flexible hose.

**Background Art**

          Generally, when new buildings such as house or apartment are constructed or old buildings are under extension working, cold/hot water pipes from outdoor are guided  
20   into a distribution device installed at bottom side of a sink, or in a built-in chest of drawers or dress-room or the like, which is, in turn, connected to each of places requiring the water such as toilet, bathroom, boiler room and/or multi-purpose place.

          Herein, in consideration of a cold/hot water pipeline leading to each of the places in demand from the distribution device, a pipe passes through inside of a Zebra-  
25   type pipe protection housing with a bent member on outer side thereof and through the floor of a room or a living room as encased by the housing, then goes to a toilet or a bathroom, by connecting each of the water field boxes mounted at an entrance of each room by means of connection pipes in order to supply cold/hot water to the bathtub, the washstand, the toilet bowl and so on.

30           Such conventional way to bury the water field box into floor has a difficulty to

repair the water field box, more particularly, involves disadvantages that it is difficult to visibly monitor the cold/hot water pipeline or the water field box hidden in the floor when there is a damage and/or a water leakage of the cold/hot water pipeline or the water field box, then it should require to dig out and excavate the floor and loot into the pipeline or the box in detail and, after completing the examination, the pipeline or the box must be buried again in the floor.

Therefore, it is recently proposed a method that directly encloses the water field box in a wall adjacent to a desired place such as the toilet or the bathroom, instead of the conventional method for hiding the water field box in the floor or ground.

However, the water field box directly encased in the wall has the cold/hot water pipeline passing through inner space thereof and a connection pipeline between a multiple water field boxes which are made of metal or synthetic resin and comprises a general form of several pipes, and the pipes are individually separated when it requires examination of the interior condition of the water field box or repair work thereof, then, after finishing the work, are combined together in the reverse order.

Accordingly, such water field box has drawbacks such as inconvenience for working and long time required and needs a complicated procedure of decomposing the water field box during the working process and of combining again in the reverse order.

## **Disclosure of Invention**

The present invention relates to a water field box to be hidden in wall including a case having a flexible hose for connecting a soft duct and a water field inside, and a plate for opening/closing the case (abbreviated to "the opening/closing plate"); wherein the flexible hose is coupled to the soft duct protected by a flexible bellow pipe through a socket having different diameters at one end and also coupled to the water field at the other end, the opening/closing plate has a frictional protrusion and a hole for repairing the plate (abbreviated to "the repair hole"), and a flange member around outline of the hole to be opened/closed by an opening plate, the socket having different diameters is for inserting and fitting a connection pipe of the water field and coupled to the opening plate through a socket inserting port and a threshold, both being formed on a

part of the opening plate, and, at the same time, coupled and integrated with the flexible hose.

### **Brief Description of the Drawings**

5           The above object, features and advantages of the present invention will become more apparent to those skilled in the related art from the following detailed description for preferred embodiments taken in conjunction with the accompanying drawing,

FIG. 1 is an exploded perspective view illustrating a water field box to be hidden in a wall according to the present invention;

10           FIG. 2 is a side cross-section illustrating the water field box of the present invention;

FIG. 3a is an enlarged view illustrating 'A' portion of FIG 2;

FIG. 3b shows an alternative example of flexible hose mounted on the water field box according to the present invention;

15           FIG. 4 is a view illustrating connection state of a socket having different diameters mounted on the water field box according to the present invention; and

FIG. 5 is a view illustrating usage of the water field box according to the present invention.

### **Best Mode for Carrying Out the Invention**

20           The present invention will be described in more detail by reference to the following embodiments which are presented for purpose of illustration and should not be construed to limit the scope of the invention thereto.

25           FIG. 1 represents an exploded perspective view of the water field box to be hidden in the wall according to the present invention and FIG. 2 shows a side cross-sectional view of the box in an assembly form.

Referring to Figures, it would be identified that the water field box 1 according to the present invention comprises a case 2 built with a flexible hose 9 and an opening/closing plate 12 to open/close the hose.

30           The flexible hose 9 is jointed to a soft duct 34 as a cold/hot water pipeline at one

end thereof and coupled with front end of a flexible bellow pipe 8 enclosing the soft duct for protection thereof through a socket having different diameters 6 and nuts 5 and 7.

5       Around front outer edge of the case 2, formed are a corner member 3 and several, preferably, four elliptical slots 4 inside the corner member 3 to connect the removable opening/closing plate 12.

      Thus, by fitting a fixture 18 through a mounting hole 17 formed on the corner member of the plate 12, the plate 12 is fixed and connected to the case 2. The slots 4 guide a correct point for fixing position to be mounted and a complete connection between the case 2 and the plate 12.

10       The opening/closing plate 12 is generally made of synthetic resin or metal material, outer surface of which has a plurality of frictional protrusions 19 suitable for applying mortar or tile and inner side of which comprises a repair hole 13 having a desirable dimension such that allows a hand of a user to enter into the repair hole.

      Such repair hole 13 is typically formed by cutting out a portion of the plate 12 to  
15   obtain a flange member 14 and protruding the flange member 14 outside and is in various forms including, but not limited to, elliptical, rectangular, hexagonal forms and the like. The repair hole is more preferably elliptical in view of appearance and available use.

      Additionally, the repair hole 13 of the plate 12 is equipped with alternative  
20   opening plate 21 for closing the repair hole 13, which is a little larger than the plate 12 to cover the edge member of the plate 12 when the opening plate 21 closes the plate 12.

      On a portion of the opening plate 21, formed is a port 23 for inserting the socket 22 (abbreviated to "the socket inserting port"). Around outer edge of the port 23 a threshold 24 in a protrusion form is formed to be securely coupled and mounted to a  
25   connector 11 of the flexible hose 9 through nuts 10 and 20 when the socket 22 is fitted into the opening plate 21. (See FIG. 4 described below).

      Further, a mounting hole 16 on bottom portion of the flange member 14 of the opening/closing plate 12 and another mounting hole 25 on bottom portion of the opening plate 21 are faced each other then receive the fixture 26. Thereafter, near a further  
30   mounting hole 15 on the flange member 14 of the opening/closing plate 12, matched are

both elliptical slots 25' formed on right and left top portions of the opening plate 21. Finally, after setting up an exact position for the opening plate 21 by using the elliptical slots 25', the opening plate 21 is attached and mounted on the flange member 14 of the opening/closing plate 12 by another fixture 26'.

5           Herein, since the elliptical slots 25' formed on the right and the left top portions of the opening plate 21 are elliptical and in the elongated slit forms instead of a simple opening structure, after slightly moving the opening plate 21 to the right or left directions to set a fixing point for the exact position as the mounting holes 16 and 25 are assembled together by the fixture 26, a complete assembly is established by fitting the fixture 26'  
10 into the elliptical slots 25'. In addition to, finishing caps 27 and 27' are further fitted into the elliptical slots 25' to give a better appearance thereof.

          Next, after fitting a connection pipe 29 having a cover 28 into the socket 22 to connect together, a water field 33 is coupled to the connection pipe thereby to complete the water field box 1 having the water field 33 hidden in the wall according to the present  
15 invention.

          Referring to FIG. 2, the water field box 1 hidden in the wall according to the present invention is installed inside the wall 30, and comprises a soft duct 34 coming from lower portion through the flexible hose 9 having improved flexibility and bending ability and connected to the water field 33 outside the water field box 1, in replace of  
20 typical rigid pipe type boxes made of metal or synthetic material.

          The soft duct 34 is the cold/hot water pipeline inflowing from the outside and connected to a distribution device mounted on a revetment of a house and/or inside a laminated wall of a building, etc. and outer portion of the soft duct 34 is surrounded by the bellow pipe 8 and inflowing into the water field box 1 through the floor or the wall.  
25 The flexible hose 9 is coupled to the opening plate 21 at outlet thereof and connected to the water field 33 to finally receive the cold/hot water.

          As described above, the opening plate 21 is fixed and coupled to the flange member 14 of the opening/closing plate 12. As the water field box 1 of the present invention is constructed, the opening/closing plate 12 is firstly jointed to the case 2 by  
30 the fixture 18 and top side of the opening/closing plate 12 is applied by mortar 31 then

covered with tiles 32. Next, the opening plate 21 is coupled to the prepared plate 12 to complete the water field box assembly 1.

Herein, on the top side of the opening/closing plate 12, formed are a preferable number of frictional protrusions 19 having desired dimension sufficient to prevent the mortar 31 coating the opening/closing plate 12 from sliding and/or moving and to obtain a complete adhesion efficiency.

Alternatively, the outer side of the water field box 1 can be finished by using the mortar 31 without the tiles 32. In this case, it is better to work the finishing process after completely assembling the opening/closing plate 12 and the opening plate 21 into the case 2.

FIG. 3a is an enlarged view of 'A' portion in FIG. 2 and represents that the flexible hose 9 is securely coupled with the socket 22 fitted into the opening plate 21 at the outlet thereof through the connector 11.

As shown in Figures, the front end of the connector 11 is engaged in the socket 22 and coupled by the nut 10 and the socket 22 is also coupled to the opening plate 21 through the nut 20 within the flange member 14.

In addition to, inside one part of the opening plate 21 faced to the flange member 14 of the opening/closing plate 12, located is a packing member 35 made of such as rubber material to greatly increase coupling strength of the opening plate 21 to the flange 14 as possible.

Returning to FIG. 3a, the flexible hose 9 of the present invention has a general form of the hose, which comprises an outer surface 37 having improved flexibility and bending ability and covered with specific stainless yarns 36 and a coil spring 38 inside to prevent the hose from being bent.

FIG. 3b illustrates alternative example of the flexible hose mounted on the water field box according to the present invention, which comprises a coil spring 38' on outer side of the flexible hose 9' already covered by the stainless yarns 36', compared to the above example of FIG. 3a.

FIG.4 illustrates the water field box 1 of the present invention connected with the socket 22.

Such socket 22 is a coupler including a main body and two circular portions having larger and smaller 40 and 39. The socket 22 has a hook groove 42 at a part of top edge 41 thereof.

Therefore, the hook groove 42 of the socket 22 is engaged with the threshold 24  
5 formed around the socket inserting port 23 of the opening plate 21. When the larger circular portion 40 of the socket 22 is coupled with the connector 11 of the flexible hose 9 as it is fitted into the socket inserting port 23, the larger circular portion 40 is fixed to rear side of the opening plate 21 by the nut 20 and, the nut 10 across the flexible hose 9 is fitted into the smaller circular portion 39 of the socket 22 as the front end of the  
10 connector 11 of the flexible hose 9 is faced to the smaller circular portion 39 of the socket 22.

As a result, the flexible hose 9 can be rigidly engaged with the socket 22 when the larger circular portion 40 of the socket 22 is fitted into the socket inserting port 23 of the opening plate 21. More particularly, since the threshold 24 is fitted into the hook  
15 groove(42) of the socket 22, it is possible to prevent the socket 22 from undesirably moving or idling and to attain a complete connection between the socket 22 and the water field when the connection pipe(29) is fitted and coupled to the socket 22 to joint the water field 33 to the socket 22.

As described above, the water field box 1 according to the present invention  
20 comprises the case 2 built with the flexible hose 9 to joint the soft duct 34 and the water field 33 and the opening/closing plate 12 to open/close the hose; wherein the opening/closing plate 12 is formed with the repair hole 13 to allow opening/closing the plate 12 by the opening plate 21 having the socket having different diameters 22 coupled with the front end of the flexible hose 9, whereby the water field box 1 of the present  
25 invention accomplishes a convenience of repairing work for the water field box 1 that it requires only the opening plate 21 to be opened, without a need of fully opening the opening/closing plate 12.

The foregoing description of the preferred embodiments of this invention has been presented for purposes of illustration and description. Obvious modifications or  
30 variations are possible in light of the above teaching. All such modifications and

variations are within the scope of the present invention as determined by the appended claims when interpreted in accordance with the breadth to which they are fairly, legally, and equitably entitled.

## 5    **Industrial Applicability**

Further, the present invention has advantages that the worker can directly monitor interior condition of the water field box 1 during the work and, when the flexible hose should be repaired or the soft duct 34 in the bellow pipe 8, as the cold/hot water pipeline, should be replaced by a new one, the repair and/or the replacement work can be  
10 conveniently conducted by firstly releasing a coupled part located in the distribution device side, then, putting a hand into the repair hole 13 and pulling the flexible hose 9 to easily draw the flexible hose 9 and/or the soft duct 34 out from the water field box 1.

Alternatively, referring to FIG. 5 which represents the usage of the water field box 1 to be hidden in the wall according to the present invention, the bellow pipe 8  
15 enclosing the soft duct 34 as the cold/hot water pipeline to protect it is connected to the water field box 1 through the floor and the wall 30 in the distribution device side and, outside the water field box 1, the water field 33 such as water tap is jointed to conveniently use the water field box 1.